Date\_\_\_\_\_\_\_\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

202 Midterm Proof Review KEY

**CHAPTER TWO PROOFS**

1. Prove by algebraic proof: If , then x = 10

Statements Reasons

1. = 5 1. Given
2. -2x-5 =15 2. Multiplication
3. -2x=20 3. Addition
4. x=-10 4. Division

2. **Given:** 

**Prove:** 

**Statements Reasons**

1.  1. Given
2.  2. Angle Addition Postulate
3.  3. Substitution
4.  4. Subtraction
5.  5. Def. of 

3. Given: 

Prove: 

Statements Reasons

1.  1. Given
2. AC=DF, BC = EF 2. Def. of 
3. AC = AB + BC, DF = DE + EF 3. Segment Addition Postulate
4. AB + BC = DE + EF 4. Substitution
5. AB = DE 5. Subtraction
6.  6. Def. of 
7. Given: 

Prove: 

Statements Reasons

1.  1. Given
2.  and are supplementary 2. Supplement Theorem

and are supplementary

1.  3. Supplements of ≅ ∠s are ≅

(Theorem 2.6)

1. Given: SO = PH

S

O

P

H

Prove: SP = OH

Statements Reasons

1. SO=PH 1. Given
2. OP = OP 2. Reflexive
3. SO + OP = OP + PH 3. Addition
4. SO + OP = SP, OP + PH = OH 4. Segment Addition Postulate
5. SP = OH 5. Substitution
6. Given:

Prove:

Statements Reasons

1. 1. Given
2.  2. Angle Addition Postulate
3.  3. Addition
4. 4. Substitution

**CHAPTER 3 PROOFS**

6. Given: || Statements Reasons

CD bisects ∠BCE 1. || , CD bisects ∠BCE 1. Given

Prove: ∠1 ≅ ∠3 2. 2. Def. of Angle Bisector.

3. 3. If ||, Alt. Int. Angles ≅.

C

A

3

2

1

B

E

D

4. ∠3 ≅ ∠1 4. Transitive (Subs)

7. Given: UD || HS Statements Reasons

DH || US 1. UD || HS, DH || US 1. given

1. Prove: ∠1 ≅ ∠3 2.  and are supplementary 2. If ||, Consecutive Interior angles

4

3

2

1

S

U

D

H

and are supplementary are supplementary

3. ∠1 ≅ ∠3 3. Suppl. Of ≅ ∠s are ≅ (Thm 2.6)

8. Given: a || b; l || m Statements Reasons

Prove: ∠2 ≅∠12

b

a

l

m

12

11

10

9

8

7

6

5

4

3

2

1

1. a || b; l || m 1. given

2. 2. If ||, corresp. ∠s are ≅

3. 3. If ||, alt. ext. ∠s are ≅

4. ∠2 ≅∠12 4. Transitive

9. Given: ∠3 and ∠8 are supplementary Statements Reasons

Prove: l || m

1. ∠3 and ∠8 are supplementary 1. Given

l

m

8

7

6

5

4

3

2

1

2. ∠8 ≅∠6 2. Vert. Angle Thm.

3. m∠3 + m∠8 = 180 3. Def. of supplementary

4. m∠8 = m∠6 4. Def. of ≅

5. m∠3 + m∠6 = 180 5. Substitution

6. ∠3 and ∠6 are supplementary 6. Def of supplementary

7. l || m 7. If Consec. Int. ∠s are suppl., then lines are ||

**CHAPTER 4 PROOFS**

10. Given: ∠1 ≅∠2, ∠5 ≅ ∠6

Prove: ΔWXY ≅ ΔWXZ

W

X

Y

Z

1

2

3

4

5

6

Statements Reasons

1. ∠1 ≅∠2, ∠5 ≅ ∠6 1. Given

2. ∠3 and ∠5 are supplementary 2. Supplement theorem

∠4 and ∠6 are supplementary

3. ∠3 ≅ ∠4 3. Supplements of ≅ ∠’s are ≅

4.  ≅  4. Reflexive Property

5. ΔWXY ≅ ΔWXZ 5. ASA

11. Given: m∠1= m∠2

2

1

E

D

C

B

A

3

4

5

B is the midpoint of 



Prove: ∠A ≅ ∠C Statement Reason

1. m∠1 = m∠2; B is midpoint of  1. Given

 bisects ∠ABD

 bisects ∠CBE

2.  ≅  2. Conv. Isos. Δ Theorem

3.  ≅  3. Definition of midpoint

1. ∠3 ≅ ∠4 4. Definition of ∠ bisector

∠4 ≅ ∠5

5. ∠3 ≅∠5 5. Transitive Property

6. ΔABE ≅ ΔCBD 6. SAS

7. ∠A ≅ ∠C 7. CPCTC

12. Given:; ;

Prove: AB ≅ FE

Statement Reason

1. ; ; 1. Given

2. ∠2 ≅ ∠3 2. Isosceles triangle thm.

3. ΔABD ≅ ΔFEC 3. AAS

4. 4. CPCTC

13**. Given:  bisects , **

4

3

2

1

T

S

P

O

**Prove: **

**Statements Reasons**

**1.  bisects ,  1. Given**

**2. 2. Def. ofAngle Bisector**

**3. 3. Reflexive**

**4. 4. SAS**

**5.  5. CPCTC**

14. Given: ∠1 ≅ ∠2 ≅∠3, ≅ 

Prove: ∠4 ≅ ∠5

Statement Reason

1. ∠1 ≅ ∠2 ≅ ∠3,  ≅  1. Given

2.  ≅  2. Conv. Isosceles Δ Theorem

3. ΔHDT ≅ ΔHES 3. SAS

4. ∠4 ≅ ∠5 4. CPCTC

7

8

15. Given: ,

Prove: 

Statements Reasons

1. 1. Given

2. 2. Reflexive

3. 3. ASA

4. 4. Reflexive

5. 5. CPCTC

6. 3. SAS

7. 7. CPCTC

16. Given: , 

Prove: 

Statements Reasons

1. ,  1. Given

2. 2. Converse Isos. Triangle Thm.

3. 3. SAS

4.  4. CPCTC

**ANSWER KEY Geometry 202 Review of Coordinate Proofs**

1. Given AC = DF find the remaining coordinates of points B and E if they are midpoints of .



B(v , t )

E(4v, t )

1. **Prove: || ||**

Slope of = . Slope of = . Slope of = 

1. Therefore, since all three slopes are equal, by definition of parallel lines,  **|| ||**
2. **Prove BE = ½ (CD + AF)**

  

BE = 3v CD = v AF = 5V

CD + AF = v + 5v = 6v. ½(6v) = 3v

Therefore BE = ½ (CD + AF)

If you prefer, since , , and are horizontal lines, the distance can be found by d=||

BE = |4v-v| = 3v CD = |3v-2v| = v AF = | 5v-0| = 5v

CD + AF = v + 5v = 6v. ½(6v) = 3v

Therefore BE = ½ (CD + AF)

2. Use coordinate geometry to prove that the medians of an **equilateral** triangle are congruent. Complete the given diagram to find missing points.

O

x

y

K(? , ?)

L(? , ?)

J(? , ?)

G(0,0)

H(2a, 2a )

I(4a, 0)

**J ( a ,  )**

**K( 3a ,  )**

**L( 2a, 0)**

Now prove:

GK = = 

IJ = 

HL = 

Therefore GK = IJ = HL, by definition of congruence, their segments are congruent.